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**United States Patent** [19]

Doan et al.

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[54] **POLISHING PAD REFURBISHER FOR IN SITU, REAL-TIME CONDITIONING AND CLEANING OF A POLISHING PAD USED IN CHEMICAL-MECHANICAL POLISHING OF MICROELECTRONIC SUBSTRATES**

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451/290

[58] Field of Search ..... **451/287, 288,**  
451/290, 443, 444

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[57] **ABSTRACT**

A pad refurbisher that provides in situ, real-time conditioning and/or cleaning of a polishing surface on a polishing pad used in chemical-mechanical polishing of a semiconductor wafer and other microelectronic substrates. The pad refurbisher has a body adapted for attachment to a wafer carrier of a chemical-mechanical polishing machine, and a refurbishing element connected to the body. The body has a distal face positioned proximate to a perimeter portion of the wafer carrier and facing generally toward the polishing surface of the polishing pad. The body travels with the wafer carrier as the wafer carrier moves over the polishing pad. The refurbishing element is connected to the distal face of the body so that the refurbishing element can operatively engage the polishing surface substantially adjacent to the perimeter of the wafer carrier. The refurbishing element is a pad conditioning device and/or a pad cleaning device that conditions and/or cleans the polishing surface of the pad to remove waste particles from the polishing surface of the polishing pad and place the pad in a desired polishing condition. In operation, the refurbishing element travels with the wafer carrier and is selectively engaged with the polishing surface while the wafer carrier presses the wafer against the polishing surface to selectively condition and/or clean generally only the deteriorated areas on the pad.

**30 Claims, 5 Drawing Sheets**

